Delayed access to care for childhood malaria

SUMMARY

This thesis describes the economic and financial factors that influence access to healthcare of children in rural Africa, discusses the consequences of delayed access to diagnosis and treatment of malaria, and tests and evaluates a strategy for reducing delays by bringing access closer to sick children in their communities.

When a child has uncomplicated malaria, immediate treatment and management is essential to prevent the disease from evolving to severe or cerebral malaria, disability or death. If the child is not treated rapidly, parasites continue to multiply, invade and destroy red blood cells. Consequently, the disease progresses unimpeded to severe malaria and is potentially fatal. Surviving children could be left with (severe) physical and/or mental disabilities which cause an emotional, physical, financial and economic burden for the family.

Although rapid access to healthcare is crucial, and facility management is essential in severe or cerebral malaria, it is often difficult for poor families to reach treatment or care because of the long distance, the lack of transport and the associated costs, although many countries have a policy of free care for children under five years old. To reduce barriers and make access to healthcare easier and more equitable, the World Health Organization recommends the use of rapid diagnosis and treatment in the community. This thesis details some of the impediments and solutions to improving access to care for childhood malaria.

In ***chapter 1***, general information is provided on malaria, and an overview of the adverse short and long-term consequences of the disease and a discussion on malaria control and treatment interventions are outlined. The chapter ends with the research objectives and an overview of the thesis.

In ***chapter 2***, research was undertaken to understand why some parents delay access to a healthcare facility for severe malaria and evaluate the role of the private costs of illness in preventing or delaying access to a facility. In a case-control study in Tanzania we compared the out-of-pocket costs of an episode of febrile illness for children treated at a public healthcare facility, at a private healthcare facility, and managed in the community. Parents of children were interviewed in the community. Cases were represented by children who went to a healthcare facility and controls by children who did not. A multivariable regression analysis was performed to understand the factors that influenced access to healthcare facilities. To complement the data on costs, a separate study was conducted at hospitals with parents of children who were admitted. The results showed that

the total out-of-pocket costs for children who went to a healthcare facility were 6 times higher than the costs for children who were not taken to a facility. The hospital study revealed that children admitted at a private hospital had 3 times higher private costs than those admitted at a public hospital. In addition, there was a positive relationship between the severity of the illness and the attendance of a healthcare facility: the more severe the symptoms, the higher the chance of attending a facility. Severity of the illness rather than household wealth influenced hospital attendance. The study suggested that without community-based malaria control strategies, households tended to use a "wait-and-see" approach and go to a healthcare facility; once the child had severe symptoms (which increases the child's risk for death and disability), the access to care was immediate.

In a qualitative study, ***chapter 3*** explores the daily life and challenges of parents of six children, each with one or more severe physical and/or mental disabilities resulting from a cerebral infection, mainly malaria. The results show that severely disabled children need constant care and supervision and this increases physical and financial burden, leaving families exhausted, sad and worried about the future. None of the disabled children were in school; parents and other family members had to stop working or reduce their working time in order to take care of the disabled child. Disability disadvantaged not only the child but also the household. Because of a decrease in occupational earnings, households had reduced financial resources and ran into difficulties in providing food and/or basic necessities, and appeared to be poorer than they would otherwise have been. With lower education than non-disabled counterparts, children may have fewer future employment prospects and consequently lower future income. The family gradually accumulated debts. Removing themselves from this poverty trap had become difficult.

Together, ***chapters 2*** and ***3*** show that the out-of-pocket costs prevent access to healthcare facilities and that delays in reaching immediate treatment may allow the illness to progress into more severe stages thus increasing the risks of disability and death. In ***chapters 4*** to ***6***, a community-based intervention to improve childhood access to malaria diagnosis and treatment was implemented in rural areas of Burkina Faso, Nigeria and Uganda. During the intervention, community health workers (CHWs) were trained following the integrated community case management (iCCM) recommendations and received rapid diagnostic tests (RDTs) and antimalarial treatment (artemisinin-based combination therapy (ACT) and rectal artesunate (RA)) so that sick children (>15,000) could be rapidly diagnosed

and treated close to their home. The logic is that the availability of RDTs and treatment within the community enables children with malaria to be treated rapidly so that the evolution of uncomplicated malaria cases to severe/cerebral cases is avoided and the potential risks and burden for death and disability are reduced. A shorter duration of the illness might occur.

In ***chapter 4***, we assessed the impact of the intervention on household costs of illness, extrapolating costs to the district level for each participating country if the intervention was scaled up. The intervention showed that the total out-of-pocket costs per episode of illness were between two to three times lower because of the intervention, with a potential total mean household saving per year for a whole district ranging from USD 29,965 in Burkina Faso to USD 303,467 in Uganda. The study revealed that improving access to malaria diagnostics and treatment in malaria-endemic areas would enable households to save money for each episode of illness, although the intervention would increase the public costs of providing healthcare.

Chapter 5 evaluates the private costs of care and time taken to reach care for severely ill children treated with RA in the community by a CHW versus children who were not treated. We tried to understand why some parents, despite immediate access to CHWs and RA for severe disease, did not go to CHWs for treatment, and whether the expectation of high costs influenced their behaviour and whether the costs for those who sought RA were different from those who did not access RA. The study showed that access to RA was faster in severe malaria for those who had CNS symptoms (i.e. repeated convulsions, altered consciousness or coma) as well as those who did not. Children with CNS symptoms treated with RA had similar costs to children who were not treated with RA. For children who did not have CNS symptoms, expenditures for RA-treated children were higher, primarily because of the costs of transportation of the child to the hospital. For children with the most severe symptoms, RA has been shown to offer faster treatment without increasing the out-of-pocket costs. In addition, all parents of children who received RA went to a healthcare facility, following the CHW's referral advice.

Chapter 6 evaluated the change in time spent by CHWs in providing voluntary healthcare in communities because of an intervention that depended upon them being the first point of contact for a sick child. The study also calculated the public health costs of remunerating CHWs for part-time care of sick children. The intervention increased access to diagnosis and treatment without substantially

increasing the time allocated to healthcare by CHWs: CHWs spent between 66 and 90 minutes per day (average 80 minutes) on child healthcare provision during the high malaria season, compared with 19-53 minutes (average of 30 minutes) before the intervention. Part-time remuneration was calculated at USD 52 in Burkina Faso, USD 295 in Nigeria and USD 141 in Uganda per CHW for one year. In addition, this research suggested that the use of CHWs can improve access to care in the community; they can be trained to recognize severe symptoms, diagnose, treat and refer children correctly. It also suggests that introducing RDTs and treatment into communities via CHWs would not require full-time CHW work, not even during the high malaria season. CHWs can thus provide healthcare and continue to allocate the majority of their time to their main income-earning occupations.

The last chapter of this thesis, ***chapter 7***, summarizes the main findings and discusses some general strengths, limitations and results of this thesis as well as the implications for research, policy and practice. The intervention was feasible. It increased access to diagnosis and treatment, decreased the risk for severe/cerebral malaria and reduced private costs. To implement the package, Ministries of Health might fund it themselves or fund it through the Global Fund to Fight AIDS, Tuberculosis and Malaria, or share the costs with the community via payments in-kind. The feasibility, affordability and acceptability of the latter option could be explored through future research. This final chapter ends with the implications and recommendations for policy and practice. Community strategies to support households with a disabled child, funding applications for large-scale implementation of the intervention package, CHW training programmes, and community sensitization and education are suggested.